

# INTERNATIONAL SEARCH REPORT

International application No. .

PCT/US03/32312

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : F41A 3/00; F41C 27/06

US CL : 42/44, 105

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 42/44, 105, 90, 85, 77, 86, 75.02: 89/148, 159, 1.8

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3,557,482 A (HOOVER) 26 January 1971, whole document	1-7, 10-15
X	US 4,833,970 A (WILHELM) 30 May 1989, whole document	6-9
X	US 4,689,911 A (WHITE) 01 September 1987, whole document	1-7, 10-15
Y	US 5,930,935 A (GRIFFIN) 03 August 1999, whole document	1-15
Y	US 6,481,145 B2 (WEICHERT et al.) 19 November 2002, whole document	1-15
Y	US 5,737,866 A (MINAIRE et al.) 14 April 1998, whole document	1-15
Y	US 6,134,823 A (GRIFFIN) 24 October 2000, whole document	1-15
Y	US 4,733,489 A (KURAK) 29 March 1988, whole document	1, 14, 15
Y	US 3,641,691 A (ELLIS et al.) 15 February 1972, whole document	1, 14, 15

☒ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"B" earlier application or patent published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

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